

In the Claims

1. (original) A composition comprising vanadium and a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina, and expanded perlite; 4) alumina; and 5) combinations thereof, wherein at least a portion of said vanadium has crystallite sizes of less than about 100 Å as determined by an analytical method such as X-Ray Diffraction.

2. (original) A composition in accordance with claim 1 wherein said vanadium is present in said composition, on an elemental vanadium basis, in an amount in the range of from about 0.5 to about 50 wt. percent, based on the total weight of said composition.

3. (original) A composition in accordance with claim 1 wherein said vanadium is present in said composition, on an elemental vanadium basis, in an amount in the range of from about 1 to about 20 wt. percent, based on the total weight of said composition.

4. (original) A composition in accordance with claim 1 wherein said vanadium is present in said composition, on an elemental vanadium basis, in an amount in the range of from about 1.5 to about 15 wt. percent, based on the total weight of said composition.

5. (original) A composition consisting essentially of vanadium and a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina, and expanded perlite; 4) alumina; and 5) combinations thereof, wherein at least a portion of said vanadium has crystallite sizes of less than about 100 Å as determined by an analytical method such as X-Ray Diffraction.

6. (original) A composition consisting of vanadium and a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina, and expanded perlite; 4) alumina; and 5) combinations thereof, wherein at

least a portion of said vanadium has crystallite sizes of less than about 100 Å as determined by an analytical method such as X-Ray Diffraction.

7. (original) A composition comprising vanadium and a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina, and expanded perlite; 4) alumina; and 5) combinations thereof, heated in the presence of oxygen and a solvent to a calcination temperature; wherein said calcination temperature is sufficient to volatilize and remove substantially all of the solvent; and wherein said calcination temperature is below the temperature which would result in the conversion of greater than about 90 weight percent of the vanadium to vanadium-and-oxygen-containing crystallites greater than about 100Å in size.

8. (original) A composition in accordance with claim 7 wherein said solvent is an aqueous solution of oxalic acid.

9. (original) A composition in accordance with claim 7 wherein said composition is heated for a time period in the range of from about 0.1 to about 24 hours.

10. (original) A composition in accordance with claim 7 wherein said composition is heated for a time period in the range of from about 1 to about 4 hours.

11. (original) A composition in accordance with claim 7 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 0.5 to about 50 wt. percent, based on the total weight of said composition.

12. (original) A composition in accordance with claim 7 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.0 to about 20 wt. percent, based on the total weight of said composition.

13. (original) A composition in accordance with claim 7 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.5 to about 15 wt. percent, based on the total weight of said composition.

14. (original) A composition in accordance with claim 7 wherein said calcination temperature is below about 400°C.

15. (original) A composition in accordance with claim 7 wherein said calcination temperature is above about 125°C and wherein said calcination temperature is below about 375°C.

16. (original) A composition in accordance with claim 7 wherein said calcination temperature is above about 150°C and wherein said calcination temperature is below about 350°C.

17. (withdrawn) A composition prepared by the method of:

a) incorporating a vanadium compound onto, into, or onto and into a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina, and expanded perlite; 4) alumina; and 5) combinations thereof, in the presence of an oxidizing agent and a solvent, to thereby form a vanadium incorporated support; and

b) calcining said vanadium incorporated support at a calcination temperature; wherein said calcination temperature is sufficient to volatilize and remove substantially all of the solvent; and wherein said calcination temperature is below the temperature which would result in the conversion of greater than about 90 weight percent of the vanadium to vanadium-and-oxygen-containing crystallites greater than about 100 Å in size, to thereby form said composition.

18. (withdrawn) A composition in accordance with claim 17 wherein said solvent is an aqueous solution of oxalic acid.

19. (withdrawn) A composition in accordance with claim 17 wherein said vanadium incorporated support is calcined for a time period in the range of from about 0.1 to about 24 hours.

20. (withdrawn) A composition in accordance with claim 17 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 0.5 to about 50 wt. percent, based on a total weight of said composition.

21. (withdrawn) A composition in accordance with claim 17 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.0 to about 20 wt. percent, based on a total weight of said composition.

22. (withdrawn) A composition in accordance with claim 17 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.5 to about 15 wt. percent, based on a total weight of said composition.

23. (withdrawn) A composition in accordance with claim 17 wherein said oxidizing agent is hydrogen peroxide.

24. (withdrawn) A composition in accordance with claim 17 wherein said vanadium compound is selected from the group consisting of: 1) ammonium metavanadate, 2) an alkali metavanadate of the formula MVO_3 , wherein M can be an alkali metal selected from Group IA, and combinations thereof; and 3) combinations of any two or more thereof.

25. (withdrawn) A composition in accordance with claim 17 wherein said support comprises alumina, meta-kaolin, and expanded perlite; and wherein said support is prepared by the method of:

1) adding said expanded perlite to a mixture of said alumina and water to thereby form a second mixture;

2) adding meta-kaolin to said second mixture to thereby form a third mixture;

3) adding a dispersant to said third mixture to thereby form a fourth mixture; and

4) calcining said fourth mixture to thereby form said support.

26. (withdrawn) A composition in accordance with claim 25 wherein said calcining of step 4) comprises heating said fourth mixture to a temperature in the range of from about 100°C to about 200°C for a first time period in the range of from about 0.5 hour to about 2 hours; and subsequently heating said fourth mixture to a temperature in the range of from about 500°C to about 750°C for a second time period in the range of from about 0.5 hour to about 2 hours.

27. (withdrawn) A method comprising;

a) incorporating a vanadium compound onto, into, or onto and into a support selected from the group consisting of: amorphous silica-alumina, a zeolite, a material comprising meta-kaolin, alumina, and expanded perlite, and combinations thereof, in the presence of an oxidizing agent and a solvent, to thereby form a vanadium incorporated support; and

b) calcining said vanadium incorporated support at a calcination temperature; wherein said calcination temperature is sufficient to volatilize and remove substantially all of the solvent; and wherein said calcination temperature is below the temperature which would result in the conversion of greater than about 90 weight percent of the vanadium to vanadium-and-oxygen-containing crystallites greater than about 100 Å in size, to thereby form said composition.

28. (withdrawn) A method in accordance with claim 27 wherein said solvent is an aqueous solution of oxalic acid.

29. (withdrawn) A method in accordance with claim 27 wherein said vanadium incorporated support is calcined for a time period in the range of from about 0.1 to about 24 hours.

30. (withdrawn) A method in accordance with claim 27 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 0.5 to about 50 wt. percent, based on the total weight of said composition.

31. (withdrawn) A method in accordance with claim 27 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.0 to about 20 wt. percent, based on the total weight of said composition.

32. (withdrawn) A method in accordance with claim 27 wherein said vanadium is present in said composition, on elemental vanadium basis, in an amount in the range of from about 1.5 to about 15 wt. percent, based on the total weight of said composition.

33. (withdrawn) A method in accordance with claim 27 wherein said oxidizing agent is hydrogen peroxide.

34. (withdrawn) A method in accordance with claim 27 wherein said vanadium compound is selected from the group consisting of: 1) ammonium metavanadate, 2) an alkali metavanadate of the formula MVO_3 , wherein M can be an alkali metal selected from Group IA, and combinations thereof; and 3) combinations of any two or more thereof.

35. (withdrawn) A process comprising:

- a) contacting, in a contacting zone, a gaseous feed stream comprising a heavy metal and oxygen with the composition of claim 1; and
- b) withdrawing a gaseous product stream from said contacting zone.

36. (withdrawn) A process as recited in claim 35 wherein said gaseous product stream contains less heavy metal than said gaseous feed stream.

37. (withdrawn) A process as recited in claim 35 wherein said gaseous feed stream further comprises a compound selected from the group consisting of sulfur oxides, CO₂, water, nitrogen oxides, HCl, and combinations of any two or more thereof.

38. (withdrawn) A process as recited in claim 35 wherein said gaseous feed stream is a combustion gas.

39. (withdrawn) A process as recited in claim 35 wherein said gaseous feed stream is a stack gas derived from the combustion of coal.

40. (withdrawn) A process as recited in claim 35 wherein said contacting of step a) is carried out at a temperature in the range of from about 100 to about 325 °C.

41. (withdrawn) A process as recited in claim 35 wherein said contacting of step a) is carried out at a temperature in the range of from about 125 to about 275 °C.

42. (withdrawn) A process as recited in claim 35 wherein said contacting of step a) is carried out at a temperature in the range of from about 150 to about 225 °C.

43. (withdrawn) A process as recited in claim 35 wherein said heavy metal comprises a metal selected from the group consisting of arsenic, beryllium, lead, cadmium, chromium, nickel, zinc, mercury, barium, and combinations of any two or more thereof.

44. (withdrawn) A process as recited in claim 43 wherein said heavy metal is mercury.

45. (withdrawn) A process as recited in claim 44 wherein said composition converts at least a portion of said mercury in said gaseous feed stream from a zero oxidation state to a +1 or a +2 oxidation state.

46. (withdrawn) A process as recited in claim 44 wherein said mercury is present in said gaseous feed stream in an amount in the range of from about 0.1 to about 10,000 µg/m³.

47. (withdrawn) A process as recited in claim 44 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 1 to about 800 $\mu\text{g}/\text{m}^3$.

48. (withdrawn) A process as recited in claim 44 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 3 to about 700 $\mu\text{g}/\text{m}^3$.

49. (withdrawn) A process as recited in claim 44 wherein said gaseous product stream contains less than about 80 weight % of the mercury contained in said gaseous feed stream.

50. (withdrawn) A process as recited in claim 44 wherein said gaseous product stream contains less than about 90 weight % of the mercury contained in said gaseous feed stream.

51. (withdrawn) A process as recited in claim 44 wherein said gaseous product stream contains less than about 95 weight % of the mercury contained in said gaseous feed stream.

52. (withdrawn) A process as recited in claim 35 wherein said gaseous product stream is contacted, in an adsorption zone, with an adsorbent selected from the group consisting of a zeolite, amorphous carbon, and combinations thereof.

53. (withdrawn) A process as recited in claim 52 wherein said composition oxidizes at least a portion of said heavy metal in said gaseous feed stream to an elevated oxidation state.

54. (withdrawn) A process as recited in claim 52 wherein said heavy metal is mercury and wherein said composition oxidizes at least a portion of said mercury in said gaseous feed stream from a zero oxidation state to a +1 or a +2 oxidation state.

55. (withdrawn) A process as recited in claim 52 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product

stream contains less than about 80 weight % of the heavy metal contained in the gaseous feed stream.

56. (withdrawn) A process as recited in claim 52 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 90 weight % of the heavy metal contained in the gaseous feed stream.

57. (withdrawn) A process as recited in claim 52 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 95 weight % of the heavy metal contained in the gaseous feed stream.

58. (withdrawn) A process comprising:

- a) contacting, in a contacting zone, a gaseous feed stream comprising a heavy metal and oxygen with the composition of claim 14; and
- b) withdrawing a gaseous product stream from said contacting zone.

59. (withdrawn) A process as recited in claim 58 wherein said gaseous product stream contains less heavy metal than said gaseous feed stream.

60. (withdrawn) A process as recited in claim 58 wherein said gaseous feed stream further comprises a compound selected from the group consisting of sulfur oxides, CO₂, water, nitrogen oxides, HCl, and combinations of any two or more thereof.

61. (withdrawn) A process as recited in claim 58 wherein said gaseous feed stream is a combustion gas.

62. (withdrawn) A process as recited in claim 58 wherein said gaseous feed stream is a stack gas derived from the combustion of coal.

63. (withdrawn) A process as recited in claim 58 wherein said contacting of step a) is carried out at a temperature in the range of from about 100 to about 325 °C.

64. (withdrawn) A process as recited in claim 58 wherein said contacting of step a) is carried out at a temperature in the range of from about 125 to about 275 °C.

65. (withdrawn) A process as recited in claim 58 wherein said contacting of step a) is carried out at a temperature in the range of from about 150 to about 225 °C.

66. (withdrawn) A process as recited in claim 58 wherein said heavy metal comprises a metal selected from the group consisting of arsenic, beryllium, lead, cadmium, chromium, nickel, zinc, mercury, barium, and combinations of any two or more thereof.

67. (withdrawn) A process as recited in claim 66 wherein said heavy metal is mercury.

68. (withdrawn) A process as recited in claim 67 wherein said composition converts at least a portion of said mercury in said gaseous feed stream from a zero oxidation state to a +1 or a +2 oxidation state.

69. (withdrawn) A process as recited in claim 67 wherein said mercury is present in said gaseous feed stream in an amount in the range of from about 0.1 to about 10,000 $\mu\text{g}/\text{m}^3$.

70. (withdrawn) A process as recited in claim 67 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 1 to about 800 $\mu\text{g}/\text{m}^3$.

71. (withdrawn) A process as recited in claim 67 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 3 to about 700 $\mu\text{g}/\text{m}^3$.

72. (withdrawn) A process as recited in claim 67 wherein said gaseous product stream contains less than about 80 weight % of the mercury contained in said gaseous feed stream.

73. (withdrawn) A process as recited in claim 67 wherein said gaseous product stream contains less than about 90 weight % of the mercury contained in said gaseous feed stream.

74. (withdrawn) A process as recited in claim 67 wherein said gaseous product stream contains less than about 95 weight % of the mercury contained in said gaseous feed stream.

75. (withdrawn) A process as recited in claim 58 wherein said gaseous product stream is contacted, in an adsorption zone, with an adsorbent selected from the group consisting of a zeolite, amorphous carbon, and combinations thereof.

76. (withdrawn) A process as recited in claim 75 wherein said composition oxidizes at least a portion of said heavy metal in said gaseous feed stream to an elevated oxidation state.

77. (withdrawn) A process as recited in claim 75 wherein said heavy metal is mercury and wherein said composition oxidizes at least a portion of said mercury in said gaseous feed stream from a zero oxidation state to a +1 or a +2 oxidation state.

78. (withdrawn) A process as recited in claim 75 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 80 weight % of the heavy metal contained in the gaseous feed stream.

79. (withdrawn) A process as recited in claim 75 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 90 weight % of the heavy metal contained in the gaseous feed stream.

80. (withdrawn) A process as recited in claim 75 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 95 weight % of the heavy metal contained in the gaseous feed stream.

81. (withdrawn) A process comprising:

a) contacting, in a contacting zone, a gaseous feed stream comprising a heavy metal and oxygen with the composition of claim 17; and

b) withdrawing a gaseous product stream from said contacting zone.

82. (withdrawn) A process as recited in claim 81 wherein said gaseous product stream contains less heavy metal than said gaseous feed stream.

83. (withdrawn) A process as recited in claim 81 wherein said gaseous feed stream further comprises a compound selected from the group consisting of sulfur oxides, CO₂, water, nitrogen oxides, HCl, and combinations of any two or more thereof.

84. (withdrawn) A process as recited in claim 81 wherein said gaseous feed stream is a combustion gas.

85. (withdrawn) A process as recited in claim 81 wherein said gaseous feed stream is a stack gas derived from the combustion of coal.

86. (withdrawn) A process as recited in claim 81 wherein said contacting of step a) is carried out at a temperature in the range of from about 100 to about 325 °C.

87. (withdrawn) A process as recited in claim 81 wherein said contacting of step a) is carried out at a temperature in the range of from about 100 to about 275 °C.

88. (withdrawn) A process as recited in claim 81 wherein said contacting of step a) is carried out at a temperature in the range of from about 125 to about 225 °C.

89. (withdrawn) A process as recited in claim 81 wherein said heavy metal comprises a metal selected from the group consisting of arsenic, beryllium, lead, cadmium, chromium, nickel, zinc, mercury, barium, and combinations of any two or more thereof.

90. (withdrawn) A process as recited in claim 89 wherein said heavy metal is mercury.

91. (withdrawn) A process as recited in claim 90 wherein said composition converts at least a portion of said mercury in said gaseous feed stream from a zero oxidation to a +1 or a +2 oxidation state.

92. (withdrawn) A process as recited in claim 90 wherein said mercury is present in said gaseous feed stream in an amount in the range of from about 0.1 to about 10,000 $\mu\text{g}/\text{m}^3$.

93. (withdrawn) A process as recited in claim 90 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 1 to about 800 $\mu\text{g}/\text{m}^3$.

94. (withdrawn) A process as recited in claim 90 wherein said mercury is present in said gaseous product stream in an amount in the range of from about 3 to about 700 $\mu\text{g}/\text{m}^3$.

95. (withdrawn) A process as recited in claim 90 wherein said gaseous product stream contains less than about 80 weight % of the mercury contained in said gaseous feed stream.

96. (withdrawn) A process as recited in claim 90 wherein said gaseous product stream contains less than about 90 weight % of the mercury contained in said gaseous feed stream.

97. (withdrawn) A process as recited in claim 90 wherein said gaseous product stream contains less than about 95 weight % of the mercury contained in said gaseous feed stream.

98. (withdrawn) A process as recited in claim 81 wherein said gaseous product stream is contacted, in an adsorption zone, with an adsorbent selected from the group consisting of a zeolite, amorphous carbon, and combinations thereof.

99. (withdrawn) A process as recited in claim 98 wherein said composition oxidizes at least a portion of said heavy metal in said gaseous feed stream to an elevated oxidation state.

100. (withdrawn) A process as recited in claim 98 wherein said heavy metal is mercury and wherein said composition oxidizes at least a portion of said mercury in said gaseous feed stream from a zero oxidation state to a +1 or a +2 oxidation state.

101. (withdrawn) A process as recited in claim 98 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 80 weight % of the heavy metal contained in the gaseous feed stream.

102. (withdrawn) A process as recited in claim 98 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 90 weight % of the heavy metal contained in the gaseous feed stream.

103. (withdrawn) A process as recited in claim 98 wherein a treated gaseous product stream is withdrawn from said adsorption zone, and wherein said treated gaseous product stream contains less than about 95 weight % of the heavy metal contained in the gaseous feed stream.

The Examiner has imposed a restriction to one of the following inventions under 35 U.S.C. 121:

- I. Claims 1 – 16, drawn to a composition, classified in class 423, subclass 594.8.
- II. Claims 17 – 34, drawn to a process of making the composition, classified in class 502, subclass 353.
- III. Claims 35 – 103, drawn to a process of treating a gas, classified in class 423, subclass 210.

Applicants affirm the election of the Group I claims but request reconsideration of the restriction requirement.

A thorough search of the inventions would necessarily include all three art classifications cited by the Examiner, thus, the examination of the merits of all the claims would impose no additional burden on the Patent Office. Therefore, Applicants respectfully request the Examiner use his discretion to examine this application on its merits, even though the Examiner believes it includes claims too distinct or independent inventions. The Examiner is granted authority under 35 U.S.C. Section 121 to make a restriction requirement when two or more independent and distinct inventions are claimed in one application. However, the language in Section 121 is not mandatory but permissive, thus, allowing the Examiner discretion in making a restriction requirement.

The Examiner has rejected claims 1 – 6 under 35 U.S.C. 102 (b) as being anticipated by Kepner et al. (U.S. Patent 6,342,191 B1).

Kepner discloses a process for producing an enhanced adsorbent particle comprising contacting a non-ceramic, porous, oxide adsorbent particle with an acid for a sufficient time to increase the adsorbent properties of the particle. See Kepner, Col. 8, lines 36 – 40. The Kepner inventors believed that the acid contacting of the particle enhances the

adsorptive capacity of the particle by increasing the number of hydroxyl groups on the particle. See Kepner, Col. 9, lines 9 – 12. Preferred adsorbent particles disclosed by Kepner include aluminum oxide, silicon dioxide and vanadium pentoxide. See Kepner, Col. 10, lines 14 – 19. Kepner also discloses that, in a preferred embodiment, the particle is microporous, even more preferably substantially microporous, having a median micropore size preferably of from 3.5 nm to 35 nm (35 Å to 350 Å) diameter. See Kepner, Col. 10, lines 19 - 22. Kepner discloses that each particle is contacted with an acid and that the length of time the particle must be contacted with the acid varies according to the ability of the particular particle to generate hydroxyl groups on the surface and pores of the particle. See Kepner, Col. 12, lines 28 – 35. Kepner further discloses that the composition can comprise an aluminum oxide particle and a co-particle which can be vanadium pentoxide or a zeolite. See Kepner, Col. 14, lines 35 – 47. Kepner also discloses that, preferably, the composition is held together using a colloidal alumina binder that has been crosslinked. See Kepner, Col. 14, lines 62 – 63. Kepner discloses that the crosslinking temperature, and thus the heating step, is from 50° C, 70°C, 110°C, or 150°C to 200°C, 250° C, 300°C or 350° C. See Kepner Col. 22, lines 6 – 9. Kepner also distinguishes cross-linking from calcining. Kepner states that while calcining removes any residual water that may be on the particle as well as change the lattice structure of the particle to form a crystalline particle, it also removes the hydroxyl groups on the binder that are required for crosslinking. Therefore, according to Kepner, heating the system during or after the crosslinking step to a temperature above the cross-linking temperature into the particle or binder calcining temperature range or above is detrimental to the system. Kepner goes on to state that “Thus, prior art systems, where mixtures of colloidal alumina and/or colloidal silica are (1) calcined or recalcined or (2) heated to form a refractory material are not part of this invention.” See Kepner, Col. 22, lines 19 – 44. Kepner also discloses that the size and shape of the particles used in their invention prior to

extruding can vary greatly depending on the end use, and that typically, for adsorption or catalytic applications, a small particle size such as 5 μm or greater to about 250 μm are preferable because they provide a larger surface area than large particles. See Kepner, Col. 23, lines 15 – 20.

Applicants point out that the Kepner reference does not disclose a composition comprising vanadium and a support selected from the group consisting of: 1) amorphous silica-alumina; 2) a zeolite; 3) a material comprising meta-kaolin, alumina and expanded perlite; 4) alumina; and 5) combinations thereof, but instead discloses separate adsorbent particles which can be either vanadium pentoxide, aluminum oxide or a zeolite, among other particles. Kepner does not disclose the use of either alumina or a zeolite as a support for vanadium. In fact, rather than supporting vanadium on a support, Kepner combines vanadium pentoxide, aluminum oxide or zeolite particles by use of a colloidal binder, with each of the separate particles being treated with an acid in order to increase their adsorptive functionality by generating hydroxyl groups on the surface and pores of each particle. This is clearly not the same as a composition comprising vanadium and a support. Further on this point, the restrictions regarding the heating temperature in Kepner are based on avoiding the removal of hydroxyl groups needed for cross-linking the various particles together.

Applicants also point out that Kepner does not disclose that the vanadium has a particle size of 35 Å, but rather discloses that the particles, which includes the vanadium pentoxide, have a median micropore size which is preferably from 35Å to 350Å in diameter. Kepner does disclose that the minimum particle size for each of the particles including the aluminum oxide, vanadium pentoxide, and zeolite, is 5 μm which is equivalent to 50,000Å. Thus, applicants point out that the Kepner reference does not disclose that at least a portion of said vanadium has crystallite sizes of less than about 100 Å.

Thus, Applicants submit that independent claim 1 and each of the claims depending variously therefrom, and independent claims 5 and 6 are patentably distinguishable over the Kepner reference. Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

The Examiner has rejected claims 7 – 16 under 35 U.S.C. 102 (b) as anticipated by or, in the alternative, under 35 U.S.C. 103 (a) as obvious over Kepner et al. (U.S. Patent 6,342,191 B1).

As stated above, Applicants point out that the Kepner reference does not disclose vanadium having a particle size of 35Å, but rather a minimum particle size of 50,000Å. Again, the intent of the Kepner reference is to bind two or more particles together using a binder, wherein each particle has been separately treated with an acid in order to increase the adsorptive capacity by generating hydroxyl groups on the surface and pores of such particles. Contrary to the Examiner's statement that "Kepner clearly discloses a vanadium supported by alumina, as well as a zeolite", Kepner clearly does not disclose such but does disclose the binding together of particles such as vanadium pentoxide and aluminum oxide having minimum particle sizes of 50,000Å using a colloidal binder. See OA, page 6, second paragraph.

Applicants submit that the Kepner reference does not disclose the limitations of claim 7 of the instant application that the composition comprises vanadium and a support and that said calcination temperature is below the temperature which would result in the conversion of greater than about 90 weight percent of the vanadium to vanadium-and-oxygen-containing crystallites greater than about 100Å in size. In addition, Applicants were unable to find, and the Examiner has not pointed out, the limitation in independent claim 7 that the inventive composition is heated in the presence of oxygen and a solvent to a calcination temperature.

Thus, Applicants submit that independent claim 7 and all of the claims depending variously therefrom are patentably distinguishable over the Kepner reference. Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

In view of the remarks above, claims 1 – 16 are believed to be in condition for allowance. Therefore, early allowance for each of claims 1 – 16 is respectfully requested.

Respectfully submitted,

CONOCOPHILLIPS COMPANY
IP LEGAL

By Jeffrey R. Anderson
Jeffrey R. Anderson
Registration No. 42,263

CONOCOPHILLIPS COMPANY
IP LEGAL
P.O. Box 2443
Bartlesville, Oklahoma 74005
918-661-9607

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Jeffrey R. Anderson
Jeffrey R. Anderson